

CLAIMS

What is claimed is:

1. An isolated polynucleotide, comprising:
 - (a) at least one copy of a polynucleotide having the sequence set forth in SEQ ID NO:9;
or
 - (b) a polynucleotide which is a variant or fragment of the polynucleotide set forth in SEQ ID NO:9, wherein the variant or fragment has a plant genetic insulator activity.
2. The isolated polynucleotide of claim 1, wherein the polynucleotide comprises at least one copy of a polynucleotide having a set forth in the group consisting of SEQ ID NOS:1, 5, 9, 10, 11, 12, 15, 16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 33, 34, 35 or 36.
3. The isolated polynucleotide of claim 1, further comprising a replicable vector; into which the polynucleotide is inserted.
4. The isolated polynucleotide of claim 3, wherein the vector is an expression vector.
5. The isolated polynucleotide of claim 3, wherein the vector is a plant vector.
6. The isolated polynucleotide of claim 3, further comprising a host cell, in which the vector is situated.
7. The isolated polynucleotide of claim 3, wherein the host cell is a plant cell.
8. The isolated polynucleotide of claim 3, further comprising a transgenic plant, in which the vector is situated.
9. The isolated polynucleotide of claim 8, wherein the plant is *Arabidopsis* or tobacco.

10. The isolated polynucleotide of claim 3, further comprising a transgenic seed, in which the vector is situated.
11. A recombinant polynucleotide, comprising:
- (a) at least one copy of a polynucleotide having the sequence set forth in SEQ ID NO:9; or
 - (b) a polynucleotide which is a variant or fragment of the polynucleotide set forth in SEQ ID NO:9, wherein said variant or fragment has a plant genetic insulator activity.
12. A method for expressing a polypeptide in a plant cell, comprising the steps of:
- (a) providing a vector comprising:
 - (i) at least one copy of either
 - (A) a polynucleotide having the sequence set forth in SEQ ID NO:9; or
 - (B) a polynucleotide which is a variant or fragment of the polynucleotide set forth in SEQ ID NO:9, wherein the variant or fragment has a plant genetic insulator activity; and
 - (ii) a structural polynucleotide coding for a polypeptide;
 - (b) inserting the vector into a plant cell, wherein the genetic insulator polynucleotide is recombined into the genomic DNA of the plant; and
 - (c) allowing the plant cell to express the polypeptide.
13. The method according to claim 12, wherein the genetic insulator polynucleotide is located immediately upstream of the polynucleotide encoding the polypeptide.
14. The method according to claim 13, wherein the plant is *Arabidopsis* or tobacco.

15. A method of making a recombinant plant cell having reduced variability of expression of a transgenic polypeptide therein, said method comprising:

- (a) providing a plant cell capable of regeneration;
- (b) transfecting said plant cell with a polynucleotide construct comprising
 - (i) a genetic insulator polypeptide, comprising:
 - (A) at least one copy of a polynucleotide having the sequence set forth in SEQ ID NO:9; or
 - (B) a polynucleotide which is a variant or fragment of the polynucleotide set forth in SEQ ID NO:9, wherein the variant or fragment has a plant genetic insulator activity;
 - (ii) a transcription initiation region; and
 - (iii) a structural polynucleotide encoding a polynucleotide;wherein the genetic insulator polypeptide, the transcription initiation region and the structural polynucleotide are operatively associated;

wherein the polynucleotide expression has a reduced variability as compared with a plant cell transfected with a polynucleotide construct that does not contain the genetic insulator polypeptide.

16. The method of claim 15, wherein expression of the transgenic polypeptide occurs in more of a plurality of the plant cells as compared to a plurality of the plant cells transfected with a polynucleotide construct that does not contain the genetic insulator polypeptide.

17. A method for insulating the expression of a transgenic polypeptide from *cis*-acting regulatory elements in the plant chromosome into which the polynucleotide coding for the expressed polypeptide has integrated, comprising:
- transfecting a plant cell with a polynucleotide construct comprising
- (a) a genetic insulator polypeptide, comprising:
 - (i) at least one copy of a polynucleotide having the sequence set forth in SEQ ID NO:9; or
 - (ii) a polynucleotide which is a variant or fragment of the polynucleotide set forth in SEQ ID NO:9, wherein the variant or fragment has a plant genetic insulator activity;
 - (b) a transcription initiation region; and
 - (c) a structural polynucleotide encoding a polynucleotide;
- wherein the genetic insulator polypeptide, the transcription initiation region and the structural polynucleotide are operatively associated;
- wherein the transfected polynucleotide construct integrates into a chromosome of the plant cell; and
- wherein the expression of the polypeptide from the integrated polynucleotide is insulated from *cis*-acting regulatory elements in the plant chromosome into which the polynucleotide coding for the expressed polypeptide has integrated.